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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,828	10/20/2005	Kazuhide Hasebe	33082M286	3997
441 7590 11/29/2007 SMITH, GAMBRELL & RUSSELL 1130 CONNECTICUT AVENUE, N.W., SUITE 1130 WASHINGTON, DC 20036			EXAMINER WATSON, JOY L	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 11/29/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/553,828

Applicant(s)

HASEBE ET AL.

Examiner

Joy Watson

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP1-286424 known hereafter as '424, and further in view of Ye et al. (US Patent 5,817,534 known hereafter as '534).

Claims 1, 5 and 6

'424 teaches cleaning a heat treatment apparatus by supplying HF gas and  $\text{NH}_3$  gas into the treatment vessel (p. 6 last 3 lines) which lasts for approximately 5 minutes which includes a time period of less than 0.6 minutes. Additionally, '534 teaches that it is desired to speed up the cleaning process to minimize the time required to clean the reactor interior (col. 5 lines 1-15). Therefore, it would have been obvious to one of ordinary skill in the art to minimize the time period to clean the apparatus in order to increase throughput and minimize the downtime of the apparatus. '424 remains silent about the specificities of deposited film. However, since  $\text{SiH}_4$  and  $\text{O}_2$  are indicated as ingredients for forming the film (p. 6 first half), formation of  $\text{SiO}_2$  film is reasonably expected within the teaching of '424. Furthermore, it is noted that nature of the film(s) indicated in the preamble(s) of the instant claim(s) apparently does not affect the cleaning process per se. Therefore, one skilled in the art would have found obvious to remove residuals from chamber surfaces upon deposition films, including films as instantly claimed, utilizing the method of '424 and '534 with the reasonable expectation of success.

Claim 2

'424 and '534 teach the method of Claim 1 and additionally '424 teaches heating the chamber up to 100°C (p. 7 middle of page). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to heat the chamber to between 100-300°C, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over '424 and '534 as applied to claim 1 above, and further in view of JP 08-195381 known hereafter as '381).

Claim 3

'424 and '534 teaches the method according to Claim 1, and '424 teaches a desired pressure during the cleaning process (p. 7 middle of the page), but they do not teach that the pressure is greater than 400 torr. '381 teaches the pressure in the treatment vessel is equal to 500 torr (p. 2 Claim 5). Because both '424/'534 and '381 teach pressures used while cleaning a heat treatment apparatus, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute one pressure for the other to achieve the predictable result of cleaning the heat treatment apparatus.

6. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over '424 and '534 as applied to claim 1 above, and further in view of JP 08-195381 (known hereafter as '381) and Goto et al. (US Patent 6,880,561 known hereafter as '561).

Claim 4 and 7

'424 and '534 teaches the method according to Claim 1, and '424 teaches using HF and  $\text{NH}_3$  to clean but is silent on the ratio of HF to  $\text{NH}_3$ . '381 teaches controlling the flow rate of HF and  $\text{NH}_3$  controls the etch rate (paragraphs 22-24); therefore, the relative amounts of HF and  $\text{NH}_3$  are result effective. It is noted that '381 teaches etching a film on a substrate rather than a chamber surface, but '561 teaches cleaning a processes chamber wall where the cleaning conditions have been determined by experimenting with substrates (col. 5 lines 31-36). The ratio of HF to  $\text{NH}_3$  controls the etch rate during the cleaning processes. Thus, it would have been obvious to one of ordinary skill in the art to apply the technique of controlling ratio of HF to  $\text{NH}_3$  as taught in '381, to improve the cleaning method taught in '424/'534 for the predictable result of cleaning the heat treatment apparatus.

***Response to Arguments***

7. Applicant's arguments filed September 19, 2007 have been fully considered but they are not persuasive.

In response to applicant's argument that '424 does not teach a period of time to clean the vessel. It is noted that time is a result effective variable and it is known in the art to minimize time required to clean (See '534 col. 5 lines 1-15).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joy Watson whose telephone number is 571-270-1267. The examiner can normally be reached on 8-5.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph L. Perrin/  
Joseph L. Perrin, Ph.D.  
Primary Examiner  
Art Unit 1792

SLW  
JLW